

After-sales Service Instructions

Testing

40

VDT-W-400/301 B
Ed. 1

Fuel-injection Pumps with Pneumatic Governor

Test Specification Form Sheet ③

A1▶

BOSCH After-sales Service
Automotive
Equipment

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Note

With the introduction of modified tolerance data, Test Instruction Manual VDT-WPP 001/4 B employed in the past is being replaced on a section-by-section basis by new individual test instructions.

For this purpose new test specification form sheets apply and are identified by a number in a circle; this number is intended to indicate the particular governor type affected.

These test instructions for fuel-injection pumps with a pneumatic governor contain testing information for Test Specification Form Sheet ③.

1. Test Port Closing, Set Plunger Lift to Port Closing, Test Angular Cam Spacing

Make the adjustment with the control rod travel for uniform delivery (value in box) unless expressly specified otherwise.

Correct in the M-pump by tappet rollers of various thicknesses, A-pump by shifting the tappet screws, P-pump by shims.

1.1

Port closing is reached when the continuous flow of calibrating oil at the nozzle-holder assembly overflow pipe changes to droplets.

Plunger lift to port closing is the path (i.e., distance) in mm from the BDC position of the plunger to port closing.

Increase the feed pressure only until calibration oil emerges without bubbles at the open bleeder screw.

1.2 Angular Cam Spacing

At the specified plunger lift to port closing of plunger-and-barrel assembly 1, set the pointer on the graduated disc to a number favorable for the measurement.

Port closing of the other assemblies is set in each case, in the specified direction of rotation, according to the degrees of angular cam spacing as follows:

4 cylinders:

1 - 3 - 4 - 2, $90^\circ \pm 0.5^\circ$ ($\pm 0.75^\circ$) each,

6 cylinders:

1 - 5 - 3 - 6 - 2 - 4, $60^\circ \pm 0.5^\circ$ ($\pm 0.75^\circ$) each.

Abnormal cam sequences and angular cam spacings are given on the applicable test specification sheet.

The tolerance for **checking** is given in each case in brackets. These values apply for checking a pump in the condition it is in when received.

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Automotive Equipment Division After-Sales Service
Department for Technical Publications KH/VDT
Postfach 50, D-7000 Stuttgart 1

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2. Set Fuel Delivery

Section A of the Test Specification Sheet

The basic setting of the fuel delivery is considered as a pre-setting — uniform position of the plunger-and-barrel assemblies — in order to check the plunger/barrel and delivery-valve assemblies, and is made as a 100-stroke measurement.

The fuel delivery given in Column 3 is the average value for all plunger-and-barrel assemblies.

The fuel delivery difference given in Column 4 applies for the plunger-and-barrel assembly of one pump.

The control rod travel given in each case is set with the associated control rod travel measuring device, with the governor cover removed. Uniform delivery should be set according to the values in boxes.

Correction in
M-pumps at the control rod clamping piece,
A-pumps at the control sleeve gear,
P-pumps at the barrel-and-valve assembly.

The tolerance for **checking** is given in each case in brackets. These values apply for checking a pump in the condition it is in when received.

3. Governor Test

Section B of the Test Specification Sheet

3.1

The **leakage test** is made at the specified vacuum (Columns 2..3): close the shutoff tap at the adjustment throttle. The drop in vacuum must lie within the specified values.

3.2 Control Rod Travel Limitation and Breakaway

Columns 4..5

The control rod travel is limited at the full-load stop screw with the pump operating at the specified speed.

Breakaway (* in the test specification sheet) is reached by placing shims under the governor spring.

3.3. Test of Control Rod Travel

Columns 6..7

The test of the control rod travel (German: "RW") is carried out in the sequence of the vacuum data given by the test specification sheet.

3.4 Torque Control

Columns 10..11

If torque control begins at too low a vacuum, the initial compression of the torque-control spring must be reduced, i.e., thinner shims must be used between the torque-control spring and the spring bolt.

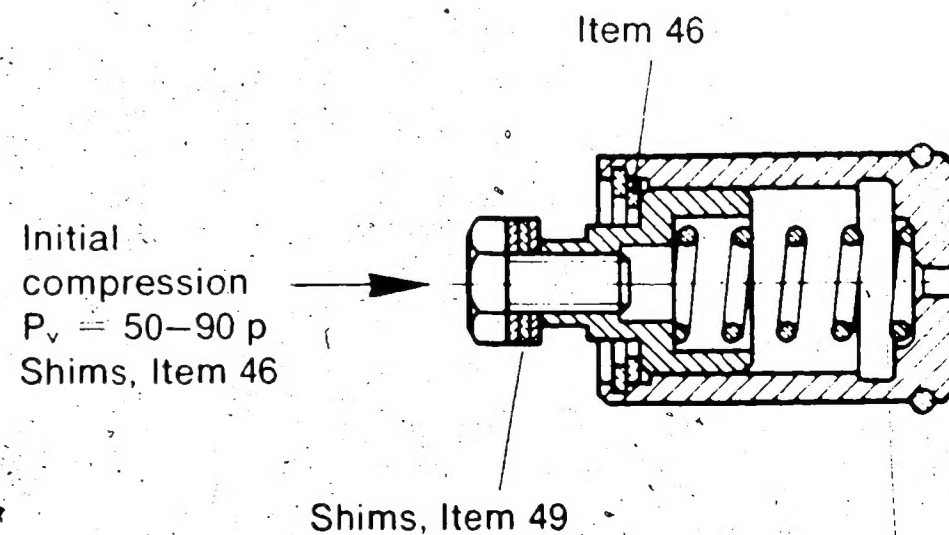
3.5 Supplementary Cam and Idle Stop

Columns 8..9

Increase the vacuum from the value given in Column 4 (control rod travel limitation) to the second value given in Column 8 and press the supplementary cam **completely** over. Decrease the vacuum again to the point of control rod travel limitation (Column 4) and then measure both values in Columns 8..9.

The difference in control rod travel between full-load and idle (Column 5 to Column 9, first value) must correspond with the data (** in the test specification sheet) given in Columns 7..8 in Section C!

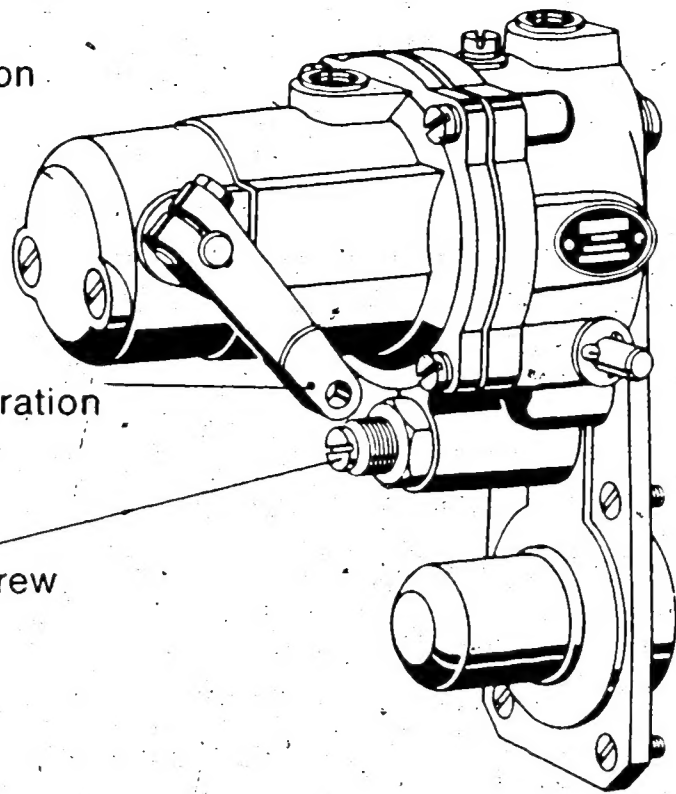
If this difference is not reached, the spring retainer must be changed accordingly: if the control rod travel is too large, remove shims (Item 49), and if the control rod travel is too small, add shims (Item 49).



Supplementary
spring in operation

Supplementary
spring out of operation

Full-load stop screw



4. Full-load Adjustment

Section C of Test Specification Sheet

4.1

The full-load control rod travel (Columns 1 . . 3) corresponds to the fuel delivery pre-set in Section A and to the control rod travel limitation set in Section B, Columns 4 . . 5.

The speed, vacuum, and fuel delivery given in Columns 1 . . 3 must be reached with the 1000-stroke measurement specified.

The **difference in fuel delivery** by the plunger-and-barrel assemblies in **one** pump given in Column 4 of Section A must be noted especially (10 times more in the 1000-stroke measurement)!

If necessary, correction in the M-pump at the clamping piece, A-pump at the control sleeve gear, and P-pump at the barrel-and-valve assembly.

4.2 Fuel Delivery Characteristics

Columns 4 . . 6

Measure the fuel delivery at the vacuums and speeds specified.

Correction if fuel delivery too high: decrease the initial compression of the torque-control spring; if the fuel delivery is too low, increase the initial compression of this spring.

4.3 Imbalance among Cylinders at Idle

Columns 7 . . 8

At the speed and vacuum specified, the idle fuel delivery must be reached. The difference in fuel delivery given in Section A, Column 4, must be noted especially here!

If there are deviations in the difference in fuel delivery, a compromise must be found between fuel delivery characteristics at full-load and at idle. When making the 1000-stroke measurement in Section C, the values given in Section A are increased by a factor of 10.

The tolerance for **checking** is given in brackets in each case. These values apply for checking a pump in the condition it is in when received.

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